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A Novel Reformulation for Bathymetry-Generated Nonlinear Flexural-Gravity Waves Computed with Fast Hybrid Preconditioning

We present solutions for bathymetry-generated flexural-gravity waves described by the nonlinear Euler equations. Different wave patterns are produced depending on the speed of the flow, and the critical speeds above or below which different responses are predicted. Our boundary integral reformulation reveals a novel integral term that yields the expected behaviour of solutions in each of the speed regimes considered. The resulting system of nonlinear algebraic equations has a highly dense Jacobian structure, which is overcome using the Hybrid-Preconditioned Newton-Krylov method.